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CONGENITAL COMPLETE PARALYSIS OF THE  
OCULO-MOTORS, THE MOVEMENTS OF  
THE IRIDES AND THE ACCOM-  
MODATION BEING INTACT. <sup>1</sup>

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BY R. TILLEY, M. D., CHICAGO, ILL.

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Complete paralysis of all the branches of both oculo-motors influencing the external movements of the eye in a boy of twelve years of age is certainly not a common affection. Still less common, judging from the literature is the above condition, associated with the normal activity of the irides and the function of the accommodation intact. I refer to the present age of the boy lest any should contend that I have not sufficient grounds for claiming for this case which I present to you a congenital origin. The mother informs me that a few days after his birth it was observed that the upper eyelids were never raised, in other words, that ptosis existed on both sides. She did not seem to be conscious, even about three months ago, of the peculiar condition of the muscles of the eyeballs.

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1. Read before the Chicago Medical Society. The patient exhibited September 7, 1885.

Whilst then the assertion of the mother as to the existence of ptosis at this early age is the most direct evidence I have to present, as to a part at least, of the difficulty being of congenital origin, it is reasonable, however, to suppose that with a paralysis of the levators, at this early age, the paralysis of the other branches of the same nerve existed at the same time. Moreover, if any marked change had occurred in the boy's eyes at any time after he began to notice much, the mother would have found it out. She has not observed any such change. That the paralysis cannot be of recent origin is evident from the failure of the recent test which I applied when I first saw the case. On asking him to touch rapidly the tip of a small object like a penholder with his index finger, using one eye at a time, he never failed to strike it exactly. I submit, then, for criticism the question of this being legitimately called a case of congenital origin with such evidence as I have presented.

The question, of course, is here not one of paralysis or paresis of individual branches of one or both of the oculo-motors, but of complete paralysis of all the branches excepting only the irides and the ciliary muscles. In looking up the literature, so far, I have found little satisfaction; so that I am not in a position to form any estimate as to the frequency with which such a difficulty is observed. One tabulated form of the cases of paralysis of the muscles of the eye, as they were observed in Dr. Hermann Cohn's clinic and published by Dr. Paul Schubert (p. 96), I find out of 199 cases of paralysis thirteen are said to have affected all the branches of the oculo-motor, leaving us to suppose that the iritic nerves and those supplying the ciliary muscles were also affected. We are, however, not informed whether both oculo-motors were affected or not. Out of these thirteen, in assigning the various causes, one only is said to have been congenital and in two the cause was unknown.

Alfred Graefe in "*Graefe and Saemisch*," when discussing the question of the paralysis of the oculo-motor and speaking of the immunity of the irides and the ciliary muscles, says: "It is remarkable that sometimes when the oculo-motor is in other respects completely paralyzed, the characteristic mydriasis and paralysis of accommodation is not present." "Possibly,"

he adds, "in such cases there exists an anatomical peculiarity, stating as the basis of his supposition that <sup>1</sup>Adamük in dissection found in three out of forty-two cases the new fibres associated with the contraction of the pupil arising from the abducens instead of the oculo-motors.

With these introductory remarks I present to you the patient, a boy of twelve years. Father and mother both living. There has been one other brother who died young. Separation will account for the fact that no other children followed this one. Under the circumstances I cannot get any direct paternal history which would be of interest. Both of the children came quickly after marriage. There was nothing peculiar that I can elicit from the mother in the way of sickness during the patient's childhood, only he was slow in walking. He is certainly not wanting in intelligence. He constitutes one member of a firm for the delivery of papers. In his school he has not done badly, especially when we take into consideration his disadvantage.

His appearance, attitude and gait present a perfect picture of the peculiarities of this affection. You will observe how both lids drop over the eyes, and that any effort to open or close them is effected by the frontalis and the corrugators. I will call attention, however, to a distinct crease which exists now in the external part of the lid, corresponding practically to the upper border of the tarsus. That crease or fold did not exist a month ago. I shall refer to that later. You will notice also that although he can stand with his head erect, in doing so he is not assuming the most advantageous position for the use of his eyes on account of their being turned downward by the action of the superior oblique muscles. To overcome this he directs the head somewhat backwards. He can use either eye at will although he prefers the left, a circumstance which is remarkable as the visual acuity of the right is considerably greater. As I lift the eyelids you will see that neither of them with the head straight serves to show him the way directly in front of him, consequently in walking, if he is using the right eye, he turns his head to the left, so as to bring the field of vision as nearly as possible

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1. Vol. VI, p. 56, Graefe und Saemisch.

in front of him, and if he is using his left eye he turns his head to the right. At the same time he combines with the sideward direction a backward direction to overcome the disadvantage of the eyes being turned downwards. All the movements of which his eyes are capable are confined to such as are possible from the antagonism of the external recti and the superior oblique muscles. Movements upwards, inwards and downwards are impossible. On inspecting the eyes you will see that the left deviates more to the left than the right does to the right, consequently when he walks, using his right eye, he turns his head less to the left than he turns his head to the right when he uses his left eye.

The distance to which the eyes deviate is so great that in no part of the visual field does he get double vision; even if such were possible the difference in the visual acuity of the two eyes might prevent the recognition of double images. The deviation you will be able to estimate roughly by the position in which he holds his book when reading with the separate eyes. You will be able to observe for yourselves, as he comes round, that the irides are active, both in the act of accommodation and when under the influence of light.

His vision is far from normal. Dist. V. L.  $\frac{6}{c}$ ; R.  $\frac{6}{XXXVI}$ , and neither eye gets any advantage from glasses. For near vision he can read Snellen 0.8 at 6" with either eye. The right does not serve him so well as the left. The left, however, is more divergent. The exact amount of accommodation he possesses I have not estimated. The ophthalmoscopic examination, made about two months ago, revealed nothing abnormal beyond a well defined small black spot on the inner and upper quadrant of the posterior surface of the left lens. I did not attempt to estimate the refraction by the ophthalmoscope.

The color sense is normal, the olfactory organ perfect, taste and hearing excellent. I mention these points to show that their investigation has not been neglected.

As to the etiology of this particular case I am strongly suspicious of the presence of specific trouble on the paternal side. The several points which are not conclusive (but of considerable importance) I prefer not to discuss at the present. The circum-

stances are not propitious for investigation. I wish, however, to advance the historical testimony against my theory. Graefe, in Vol. VI, p. 72 of "Graefe and Saemisch," leads one to infer that he has not observed paralysis as a result of congenital specific trouble, or at any rate, that it is very rare, and states that he does not find it in the books on the special subjects of inherited syphilis in its influence on the eye and ear by Jonathan Hutchinson. As I may be liable to obtain later more direct information bearing on the case, I will leave the question without further discussion at present.

As to the seat of the lesion the matter is of course one of speculation. But the speculation is highly interesting. Its extent and uniformity alone, I think, excludes any conception of its being peripheral in origin. It would be folly to entertain the idea of any obstruction in the orbits. The meninges are the favorite seat of primary specific deposits, but were the meninges the chief source of trouble here we should probably have had other associated difficulties, either of hearing, smell or paralysis of other nerves. If then we exclude the peripheral origin, exclude any obstruction in the orbit, if we do not find sufficient evidence of meningeal trouble, we must seek for the lesions in the cerebral substance somewhere, either at the origin or course of the nerves before leaving the brain substance. Further speculation as to the location in the cerebral substance I leave to others. I will here call attention, however, to one important circumstance which somewhat favors the view that the lesion is in the nerve substance. There is complete absence of the patellar reflex. Now, however guarded we may be in our views of the relation of the patellar reflex to nerve tissue changes, we must admit that they are frequently associated. We also know that paralyzes of the ocular muscles are commonly associated with the development of locomotor ataxia, one of the symptoms of which is the lack of the patellar reflex. He has, however, none of the other symptoms of locomotor ataxia as far as I can elicit. The diminution of visual acuity may also contribute something towards the supposition of the lesion being in the brain substance. Whatever theory we may adopt as to the pathological condition it is difficult to realize with our pres-

ent knowledge, how the fibres supplying the irides, and the ciliary muscles should have so uniformly escaped. It seems necessary to suppose the existence of some anatomical peculiarity, or the development of a vicarious action in the branches coming from the ophthalmic division of the fifth nerve. It will be remembered that the short root from the motor-oculi unites with the long root of the ophthalmic division of the fifth to form the lenticular ganglion. I submit that it is not impossible that this otherwise sensory nerve may under the circumstances associated with a congenital defect take upon itself functions such as would under normal circumstances be performed by the ordinary motor nerve. Or it may be as Graefe suggests, that the abducens has in this case supplied the motor fibres.

My treatment you will in part have anticipated from the view I have taken of the etiology. I will, however, add that in addition to a specific treatment I have been using electricity, not with any great expectation. The difficulty of applying it in the given case to the affected nerves is considerable, nevertheless I am applying it. Further, to leave no available effort untried, on finding there was marked phymosis with considerable elongation of the prepuce I circumcised him, about three weeks ago, in order that if there was any influence associated with reflex action from that source I might remove it. A little circumstance, small as it is, I cannot fail to mention which has occurred since the circumcision. Six days after the operation, when the boy came down to my office I was observing the crease or fold I referred to above in the upper eyelid corresponding to the upper border of the tarsal cartilage, and while I was searching mentally for a means of ascertaining, without putting a leading question as to whether the mother had noticed any peculiarity, she told me, as though anticipating my thought, that the crease or fold in the upper eyelid had developed since the operation.

The prognosis as to relief of the difficulty does not seem promising, but I must say that within the past week my expectation has greatly increased. The movements of the eyes are certainly greater.



## A CASE OF SPINDLE-CELL SARCOMA OF THE LACHRYMAL GLAND.

BY ADOLPH ALT, M. D.

On September 4, 1884, F. Y., at. 46, was sent to me in consultation by Dr. Frank of this city. He gave the following history:

Had always been a strong, healthy individual, in whom the animal was especially well developed. Some three weeks ago he had an attack of a feverish disease, attended with unconsciousness, which apparently lowered his constitutional vigor very considerably. When becoming conscious he noticed that his left eye was shut, that he was unable to lift the lid voluntarily and that he saw double.

*Status præsens.* There is a slight ptosis of the left upper lid, which he states is much better than it has been. There is also paralysis of the internal rectus muscle of the left eye. The double images annoy him so that he cannot dare to drive out alone, being afraid to run into somebody. V. of O. D. =  $\frac{20}{\times \times \times}$ ; O. S. =  $\frac{20}{\times \times}$ . Ophthalmoscopic examination reveals nothing pathological.

As I could detect no other lesion whatsoever, which might have given a clue to the right diagnosis, I could only think of a central lesion. His right patellar reflex seemed increased; his left one diminished.

Syphilis being the most probable cause of such a lesion, I inquired again closely into his history, but I could not elicit anything in this direction. The patient acknowledged an almost superhuman use of his sexual organs, but nothing further; nor knew his family physician of any former syphilitic or even doubtful affection.

The patient was, however, for some time put on anti-syphilitic treatment, but his condition did not change.

I did not see the patient again for some time, but was informed that he had developed symptoms of tuberculosis of the lungs, and had, therefore, been sent to Florida. After some months he returned from there considerably worse.

March 30th, 1885. I saw the patient again in consultation, and found the following conditions:

Continued and almost unbearable pains in and around orbit and upper jaw on left side, (the patient had all his teeth pulled). The left eye now protruded about seven mms. from the orbit in an absolutely straightforward direction. The upper lid, considerably elongated, covered the eyeball, but could not be raised. No possibility to move the eyeball in any direction. Pupils wide ad maximum, immoveable; optic nerve atrophied. It was impossible to feel any tumor behind the eye, but the lachrymal gland could be felt in the upper outer part of the orbit. The whole circumorbital region greatly swollen and œdematous.

These conditions, and especially the straightforward exophthalmus led me now to the diagnosis of a probable tumor of the optic nerve.

Although the general condition of the patient was bad, and a success *quoad vitam* was not to be hoped for, we decided to remove this tumor as a palliative measure, and to free the patient from the enormous pain, if possible.

March 31. The patient being put under the influence of chloroform, I made an incision over the rectus internus and tenotomy of that muscle, with the intention to explore the tumor and eventually to remove it without sacrificing the eyeball. To my astonishment I found it impossible to feel a tumor, but the eyeball seemed to lie firmly in a solid socket. I then proceeded with the enucleation of the eyeball. It became now possible to palpate the tumor which extended almost across the orbit, and had an opening through which the optic nerve had passed forward to the eyeball. It evidently included or had started from the lachryal gland. There was but little hæmorrhage. After a thorough removal of all pathological tissue, the orbit was dressed with absorbent cotton soaked in a sublimate solution



1:2000. The operation was done with antiseptic precautions, the instruments, sponges and hands of the operator, as well as of the assistants (Drs. Frank, Hunicke, Richter and Luedeking) being soaked and washed in a solution of sublimate 1 to 4000.

In spite of all these precautions a large and very painful abscess formed in the upper lid within the next few days, and led to gangrene of the skin of that lid.

The patient died about two months later from what was undoubtedly a general sarcomatosis.

Specimens taken from different parts of the tumor all showed the same structure, *viz*: round cells, small spindle-cells, and large very closely packed spindle-cells. The round-cells and small spindle-cells are most frequent in the younger portions of the tumor, whilst the larger densely packed spindle-cells evidently form the oldest portion of the growth, and more especially of that part which took the place of the lachrymal gland. There were hardly any blood vessels in the tissue of the tumor and almost no connective tissue. I also have been unable to find any trace of the normal structure of the lachrymal gland.

## TRANSLATION.

In connection with Dr. Lucien Howe's article "On The Pulsating Variation of Intra-ocular Tension, etc.," (cf. page 137, No. 7, this JOURNAL) it will be of interest to our readers to get the following report of Dr. Hoeltzke's paper "On Experimental Researches on Intra-ocular Tension," read before the Physiological Society at Berlin, as we find it in the *Centralblatt fuer Praktische Augenheilkunde*.

The statements found in literature regarding the action of eserine, pilocarpine and atropine on the intraocular tension are very incomplete and partially conflicting. Von Hippel and Gruenhagen were unable to find any influence of atropine or calabar-bean extract upon the tension of the anterior chamber; according to Wegner the tension of the eye is considerably reduced; Adamuek also found that the tension was reduced after the instillation of atropia to the extent of two mms. Hg.; Laqueur stated that atropia increases the tension; Pflueger is of the opinion that the tension is reduced by atropia. With regard to the myotic principle of the calabar-bean, it is the opinion of Adamuek that it increases the intra-ocular tension to the extent of three mms. Hg.; according to Pflueger eserine (physostygmmin) increases the tension of the rabbit's eye to the extent of six mms. Hg. Pflueger, moreover, is thus far the only author who has published manometrical experiments concerning the influence of pilocarpine on the intra-ocular tension. He states that the action of this alkaloid is to reduce the tension and, combining the manometrically proved tension-increasing action of the eserine with the clinical experience, that eserine in cases of glaucoma causes a contraction of the pathologically dilated pupil and decrease of tension, he concludes that eserine "primarily" increases the tension of the eye, but that the myosis due to the action of the eserine in such eyes with a pathologically increased tension more than compen-

sates this noxious tension-increasing influence by freeing the exit of the fluids from the anterior chamber in the iris-angle. On the other hand, since pilocarpine, notwithstanding its myotic action, primarily reduces the tension; and secondly, since atropine, although it dilates the pupil, reduces the tension also, in *physiological* conditions, according to Pflueger, the width of the pupil cannot have any influence upon the intra-ocular pressure.

\* \* \* Since we cannot here give the tracings of the curves showing the influence of eserine and atropia of the intra-ocular pressure, we will give a number of results of a series of successful experiments:

Medium maximum under atropia (pupil wide),	-	-	35.2 mms. hg.
" " " eserine (pupil differing),	-	-	37.4 "
" " " " (pupil wide),	-	-	42.25 "
" " " " (pupil narrow),	-	-	32.5 "
" " without instillation (pupil differing),			34.3 "
" " " " (pupil wide),	-	-	35.0 "
" " " " (pupil narrow),			33.33 "

The proportion is very similar between the numbers arrived at with regard to the minimum effects. \* \* \*

\* \* \* The result gained from the curves and these numbers is:

1. Eserine considerably increases the tension of the anterior chamber, but the myosis, caused by eserine, not only compensates this tension-increasing influence, but even reduces the tension of the anterior chamber below the physiological medium.

2. Atropine decidedly lacks a tension-increasing action, but the pressure in the anterior chamber is increased by its dilating influence upon the pupil.

3. In the non-poisoned eye (under physiological conditions), the pressure in the anterior chamber is increased with the dilatation and reduced with the contraction of the pupil.

The fact that the tension of the anterior chamber is reduced when the pupil is contracted, which is now established by the experiment, is of especial interest, since von Helmholtz stated that this tension was reduced during the act of accommodation.

\* \* \*

\* \* \* With regard to the action of pilocarpine the following results were arrived at:

Medium maximum with pilocarpine (pupil narrow nine times, wide once),	- - - - -	28.6
Medium maximum without instillation (pupil narrow five times, wide five times),	- - - - -	27.0
Medium maximum with pilocarpine (pupil narrow nine times, wide once),	- - - - -	21.7
Medium maximum, without instillation (pupil narrow five times, wide five times),	- - - - -	20.3

From these figures and the curves which were obtained, it is evident that pilocarpine also "primarily" increases the tension, although much less than eserine. \* \* \*

All these statements concern the tension within the anterior chamber; but experiments made with regard to the tension in the vitreous body gave constantly the result, that there exist no material differences concerning the pressure in these two cavities.

The degree of the intra-ocular tension is dependent on the blood-pressure. Whatever influences increase the blood-pressure, heighten the intra-ocular tension, too, as for instance, the intoxication by carbonic acid gas, the irritation of the splanchnic nerves, of the vascular center, of the sympathetic nerve, of the sensory nerves, the ligation of large arterial vessels (aorta abdominalis), the ingestion of certain poisons (nicotine). In the same manner a stasis in the venous system will act; especially near the eyeball (ligation of the venæ vorticosæ); moreover, the changes in the blood-pressure due to respiration are transmitted to the eye in such a way that the intra-ocular tension is somewhat increased during expiration. Whatsoever reduces the general blood-pressure also reduces the intra-ocular pressure, viz: Large hæmorrhages, weakness of the heart, cutting the splanchnic nerves, the sympathetic nerve, the cervical medulla, irritation of the depressor nerve, of the central portion of the upper laryngeal nerve, etc.; furthermore, narcotics (chloroform, morphium, chloral and curare), finally death; after the latter has occurred the intra-ocular pressure is usually 8 to 10 mms. Hg.

\* \* \* The only nerve whose influence upon the circulation of the eye and the intra-ocular pressure is known, is the sympathetic nerve. If the cervical portion of this nerve is cut the pupil is

contracted and the intra-ocular tension invariably sinks as much as 6 mms. Hg.; irritation of the peripheral stump causes almost always an increase of the intra-ocular tension amounting to 14 mms. If the faradic irritation be continued for some time, the intra-ocular pressure will become reduced, while the irritation yet lasts, but the increase is never totally lost. By means of irritation with very weak currents, which just only produce a dilatation of the pupil, an increase of intra-ocular pressure may be produced which will remain at the same height for one minute. Irritation of the ganglion supremum gives the same results, but here the currents must be stronger. \* \* \*

All of these statements hold good for both the vitreous body and the anterior chamber. The action of the sympathetic nerve depends on its influence on the circulation of blood in the eye. Compression of both carotid arteries reduces the intra-ocular tension to the very considerable amount of 14 mms. Hg. Irritation of the sympathetic nerve has then no longer any influence. The same may be proven by another experiment. If the contents of the eyeball are by use of the manometer put under a pressure of 100 mms. Hg. and more, the circulation in the orbital vessels remains unaltered, but no blood can get into the eyeball; under these circumstances the irritation of the sympathetic nerve is again unsuccessful, although the pupil is by it dilated, in this case as well as when the carotid arteries have been tied. This proves erroneous the opinion of von Hippel and Gruenhagen, who ascribe to the non-striated muscular fibers of the orbital tissue the tension-increasing influence of the irritation of the sympathetic nerve, and who expect a reduction of the intra-ocular tension due to the contraction of the blood-vessels when the cervical portion is irritated.

The action of the sympathetic nerve upon an eye being under the influence of atropia was also examined into. Cutting the cervical portion generally causes a smaller reduction of the intra-ocular pressure than in the normal eye, sometimes even none at all, although the pupil contracts; but the cutting is never followed by an increase of the intra-ocular pressure. Irritation of the sympathetic nerve causes increase of pressure, as it does in the normal eye; but the increase is not as large as in the normal eye.

During these experiments it was found that an eye being under the influence of atropia, as a rule, showed a lower rate of pressure than one not under the influence of this drug. The action of atropia was, therefore, again made the subject of experiments. Seven technically very successful experiments yielded the following medium maxima:

WITH ATROPIA.

Medium maximum, 37.0 mms.  
Pupil wide six times,  
Pupil narrow once.

WITHOUT ATROPIA.

Medium maximum, 40.7 mms.  
Pupil wide three times.  
Pupil narrow four times.

From this results, that the rule, laid down above, viz., that atropia has decidedly no direct tension-increasing action upon the aqueous humor, must be amended in the following manner:

*Atropia alone decidedly reduces the intra-ocular pressure, but it increases it by causing a dilatation of the pupil.*

Since, as was proven, the sympathetic nerve acts upon the intra-ocular tension by way of the blood-pressure only, namely, by reducing the caliber of the intra-ocular blood-vessels; since, furthermore, eserine also produces constriction of the blood-vessels and increase of intra-ocular pressure, while atropia and section of the sympathetic nerve cause dilatation of the blood vessels and increase of intra-ocular tension, we are forced to the conclusion that, caused by the constriction of the intra-ocular blood-vessels (within certain limits) and the consequent increase of the intra-vascular pressure, more fluid is transuded into the eyeball. \* \* \*

\* \* \* Finally, the regular combination of an increase of the intra-ocular tension with dilatation of the pupil, and of a decrease with the contraction of the pupil, must thus simply be considered due to changes in the circulation, since mydriasis reduces the circulatory area of the uveal tract, while myosis enlarges it.

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An article, published in the *Revue Clinique d'Oculistique*, by Dr. Coppez, "Once More Jequirity," ends with the following conclusions:

\* \* \* "I have no reason to modify the favorable conclusions with regard to jequirity, which I have formulated last



year. I will go further and say that jequirity cures inveterated trachoma with more certainty than an iridectomy glaucoma, Saemisch's operation a serpiginous ulcer of the cornea, Bowman's operation the obstruction of the lachrymal channels.

I uphold the superiority of jequirity above blennorrhœal inoculation in complete pannus. It has all its advantages, without any of its inconveniences and dangers. (?Editor).

I have said that, thanks to Von Wecker, the indefatigable defender of jequirity, the blennorrhœal inoculation, the barbarous remedy, has ceased to live; I repeat it to-day, I even consider it a crime to recur to it at this hour, when as yet, those that do not forget must remember the long nights passed sleepless after some inoculations with a bad result.

Sydenham would rather have given up the practice of medicine than have done without opium. I should prefer to leave my granules in the hand of good Dame Nature, than to give up treating them with jequirity.

## CORRESPONDENCE.

*Dear Doctor:*—In the next issue of the AMERICAN JOURNAL OF OPHTHALMOLOGY will you kindly have the abstract of my paper published as reported by myself in the *Medical News*. I wish to call special attention to the peculiar formula (glass made) which gave my patient  $\frac{20}{XX}$ . In the report as published elsewhere everything was out. I will send you a reprint by this day's post.

Very respectfully,

L. WEBSTER FOX, M. D.

The point to which the doctor wishes to have the attention of our readers drawn especially is the following (EDITOR):

Obs. II.—Recovery of vision after eighteen years of blindness. Vision after operation  $\frac{5}{66}$  increased by a glass = sph. + 10 D  $\bigcirc$  cyl. + 3, D ax. 180  $\bigcirc$  cyl. + 2 D ax. 50° (ground in one) =  $\frac{20}{XX}$ . Reading sph. + 14 D  $\bigcirc$  cyl. + 1.50 ax. 50° J  $\frac{1}{10}$ .

## EDITORIAL NOTICE.

The editor of this Journal takes great pleasure in announcing to the profession that Messrs. J. H. Chambers & Co. have now in print a *theoretical and practical treatise on astigmatism*, written by the able pen of Dr. Swan M. Burnett, of Washington, D. C.